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EXAMINER	
HADIDI, JON	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/881,424	Applicant(s) WITTENBRINK, CRAIG M.	
	Examiner Jon Hadidi	Art Unit 2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *15 October 2001*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-7, 10 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the pixel value storage" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 6, lines 1-2 is indefinite with respect to the claim language “wherein said the fragment buffer” because the word “the” appears to be unnecessary. Appropriate correction, such as deleting the word “the”, is required.

Claim 7, lines 5-6 is indefinite with respect to the claim language “fragment for to the pixel location” because the word “to” seems unnecessary. Appropriate correction, such as deleting the word “to”, is required.

Claim 10, line 9, is indefinite with respect to the claim language “a detected fragment” because “a fragment” is also detected in line 6 of claim 10, and it is unclear whether “a detected fragment” in line 9 is the same fragment, or a different fragment from, “a fragment” in line 6. Appropriate correction is required.

Claim 17, line 16 is indefinite with respect to the word “retreival”. Appropriate correction, such as changing “retreival” to “retrieval”, is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4-12, and 14-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Morein, U.S. Patent No. 6,670,955.

With regard to claim 1, Morein describes a first storage (Fig. 1, Color Buffer 116); a fragment buffer that holds multiple fragments for overlapping data (Fig. 1, Fragment Buffer 106); and one of instructions and hardware that causes said device to detect in the fragment buffer a fragment representing predetermined one of closest and furthest visible data for the pixel location (col. 5, lines 41-48 and col. 6, lines 1-3), blend the predetermined one with any preexisting contents of the first storage that represent data that is to be visible in an output image (Fig. 3, step 322), and repeat the detecting and blending until no more unprocessed fragments representing visible image data are left in the fragment buffer for the pixel location (Fig. 3, step 328); wherein detection of the predetermined one is performed using a Z-value storage to isolate during a first pass through the fragment buffer a Z-value corresponding to the predetermined one (col. 5, line 66 to col. 6, line 5), and to match during a second pass through the fragment buffer

contents of the Z-value storage against fragment buffer contents to isolate the predetermined one (col. 6, lines 6-22).

With regard to claim 2, Morein describes first, detecting any fragment representing a closest opaque data, moving such fragment to the first storage to overwrite any prior contents (col. 5, lines 30-45) and removing such fragment from further consideration as fragment buffer contents (Fig. 3, step 326); second, examining depth of fragments in the fragment buffer relative to any closest opaque data and removing from further consideration any fragments obscured by closest opaque data (col. 5, lines 49-56); and third, compositing any fragments for the pixel location remaining in the fragment buffer with contents of the pixel value storage in back-to-front order (Fig. 3, step 322).

With regard to claim 4, Morein describes the fragment buffer stores fragments that collectively representing multiple pixel locations (col. 4, lines 18-30 and col. 5, lines 45-47); the pixel value storage (Fig. 1, Color Buffer 116) is part of a frame buffer, the frame buffer having at least one first storage location for each pixel within an image region (Fig. 1, Frame Buffer 104, and col. 4, lines 37-41); and said device further comprises one instructions and hardware that composites data by successively examining fragments in the fragment buffer and by combining those fragments into the frame buffer as the predetermined one for the corresponding pixel location (Fig. 3, step 322) or returning them to the fragment buffer if they are not the predetermined one (Fig. 3, step 324), and by repeating the combining or returning until the fragment buffer is completely empty (Fig. 3, step 328).

With regard to claim 5, Morein describes first, detecting any fragment representing a closest opaque object, moving such fragment to the first storage and removing such fragment from further consideration as fragment buffer contents (col. 5, lines 30-45 and Fig. 3, step 326); second, examining depth of fragments in the fragment buffer relative to any closest opaque image object and removing from further consideration any fragments representing data obscured by a closest opaque object (col. 5, lines 46-56); and third, compositing any fragments remaining in the fragment buffer corresponding to the particular pixel location with contents the first storage in back-to-front order (Fig. 3, step 322).

With regard to claim 6, Morein describes wherein said the fragment buffer is a first-in, first out memory (col. 3, lines 51-53) and wherein said device examines successive fragments in the fragment buffer and either composites those fragments if they represent furthest visible data for a pixel location (Fig. 3, step 322), or returns those fragments to the fragment buffer if they do not represent furthest visible data a pixel location (Fig. 3, step 324), and performs the compositing or returning until the fragment buffer is completely empty (Fig. 3, step 328).

With regard to claim 7, Morein describes a state generation unit (Fig. 1, circuit 100) that produces state information to indicate at least: a state that there is a fragment for to the pixel location representing relatively closer opaque data than other fragments in the fragment buffer which have not yet been invalidated (col. 5, lines 41-48); and a state that there are at least two fragments each representing visible data for a corresponding pixel location (col. 6, lines 6-15).

With regard to claim 8, Morein describes the first storage is part of a frame buffer (Fig. 1, Frame Buffer 104) having a unique address space for each pixel location, the unique address space for each pixel location adapted to store color and intensity information as well as state information for the pixel location (col. 4, lines 58-61).

With regard to claim 9. Morein describes the Z-value storage (Fig. 1, Z-buffer 118) and the pixel value buffer (Color Buffer 116) are part of a frame buffer (Frame Buffer 104); said device further comprises a second Z-value storage (Fig. 2, Z-function logic 202); and the Z-value storage of the frame buffer and the second Z-value storage are used in alternating fashion in a manner where one Z-value storage holds a Z-value for fragment representing a predetermined one of closest and furthest visible data for a particular pixel location that will be moved and removed from the fragment buffer during a current pass through the fragment buffer (Fig. 1, Z-buffer 118 and col. 5, lines 41-45 and col. 5, line 66 to col. 6, line 5), while the other Z-value storage is used to sort Z-values for other fragments for the particular pixel location that will be moved and removed during a subsequent pass through the fragment buffer (col. 5, lines 49-65).

With regard to claim 10, Morein describes detecting a fragment representing transparent data for a pixel location (Fig. 3, step 304); storing a depth value of a detected fragment in a Z-value storage if the depth value for the fragment indicates data for the fragment is relative closer to the desired viewing perspective than data for previously detected fragments (col. 5, lines 41-48); using the stored depth value to identify the fragment representing closest remaining visible data for the pixel location (col. 5, lines 49-56), compositing the fragment with contents of the pixel value storage

for that particular pixel location (Fig. 3, step 322), and inhibiting further consideration of such detected fragment from further consideration as fragment buffer contents (Fig. 3, step 326); and repeating the processing of contents of the fragment buffer until no more fragments are left for consideration in the fragment buffer for the particular pixel location (Fig. 3, step 328).

With regard to claim 11, Morein describes storing in the fragment buffer multiple fragments representing data overlapping in at least one pixel location (col. 4, lines 18-30 and col. 5, lines 45-47); using the hardware logic to index, detect and remove from the fragment buffer fragment representing a predetermined one of closest and furthest visible image data at the pixel location (col. 5, lines 41-48 and col. 6, lines 1-3, and Fig. 3, step 326); combining that predetermined one with any preexisting pixel value storage contents that represents visible data (Fig. 3, step 322); and repeating the using and combining until no more fragments are left in the fragment buffer that correspond the pixel location (Fig. 3, step 328).

With regard to claim 12, Morein describes first, detecting any fragment representing closest opaque data, moving such fragment to the pixel value storage to overwrite any prior contents and removing such fragment from further consideration as fragment buffer contents (col. 5, lines 30-45 and Fig. 3, step 326); second, examining depth of fragments in the fragment buffer relative any closest opaque image data and removing from further consideration any fragments that are obscured by closest opaque data (col. 5, lines 49-56); and third, compositing the fragment buffer any fragments

remaining in with contents of the pixel value storage in back-to-front order (Fig. 3, step 322).

With regard to claim 14, Morein describes generating state information indicating at least a state that there is opaque data for the pixel location relatively closer than other data represented by fragment buffer fragments which have not yet been invalidated (col. 5, lines 41-48), and a state that there are at least two fragments representing visible data for the pixel location; and using the state information for the pixel location to process fragments in a manner dependent upon the state information (col. 6, lines 6-22).

With regard to claim 15, Morein describes detecting a fragment representing transparent data for a pixel location (Fig. 3, step 304); storing a depth value associated with a detected fragment in a Z-value storage if the depth value indicates that data for the detected fragment is relatively closer to the desired viewing perspective than data for previously detected fragments (col. 5, lines 41-48); using the stored depth value to determine the closest transparent data at the particular pixel location (col. 5, lines 49-56), compositing the fragment representing closest transparent data with contents of the pixel value storage for that pixel location (Fig. 3, step 322), and inhibiting further consideration of such detected fragment from further consideration as fragment buffer contents (Fig. 3, step 326); and repeating the processing of contents of the fragment buffer until no more fragments are left for consideration in the fragment buffer for the particular pixel location (Fig. 3, step 328).

With regard to claim 16, Morein describes the repeating is performed on a fragment-by-fragment basis for fragments in the fragment buffer (Fig. 3, step 328), with fragments not constituting the predetermined one being returned to the fragment buffer (Fig. 3, step 324) in first-in, first out format (col. 3, lines 51-53), until no more fragments are left in the fragment buffer (Fig. 3, step 328).

With regard to claim 17, Morein describes first, identifying and storing a first fragment in a first buffer (Fig. 1, Render Backend Block 114 and col. 5, lines 1-4), with remaining fragments representing overlapping visible data being stored in a second buffer (Fig. 1, Fragment Buffer 106), where the first fragment represents a predetermined one of closest and furthest visible data from a desired viewing perspective (col. 5, lines 41-48 and col. 6, lines 1-3); second, generating an index that permits retreival of the first fragment with respect to fragments in the second buffer for the particular pixel location, and storing the index in a third buffer (Fig. 1, Z-buffer 118 and col. 6, lines 6-15); and third, using the contents of the third buffer to identify and remove a fragment from the second buffer in dependence upon depth, and blending the removed fragment with contents of the first buffer (Fig. 3, step 322 and step 326).

With regard to claim 18, Morein describes the first buffer is part of a frame buffer and the frame buffer includes a pixel value storage unique to the particular pixel location (Fig. 1, color buffer 116, which is part of Frame Buffer 104); the second buffer is a fragment buffer that collectively holds fragments for multiple pixel locations (Fig. 1, Fragment Buffer 106); and the third buffer is a Z-value storage corresponding to the particular pixel location (Fig. 1, Z-buffer 118).

With regard to claim 19, Morein describes placing multiple fragments into a fragment buffer (Fig. 3, step 304); polling fragment buffer contents to identify a predetermined one of maximum and minimum Z-value for fragments for the particular pixel location (col. 5, lines 41-48 and col. 6, lines 1-3); moving the identified fragment to a frame buffer, combining that fragment with any preexisting contents that are to be visible in an output image (Fig. 3, step 322), and removing the identified fragment from further consideration as fragment buffer contents (Fig. 3, step 326); and repeating the polling and moving until no further fragments are left for the particular pixel location (Fig. 3, step 328).

With regard to claim 20, Morein describes storing fragments corresponding to many pixel locations, all collectively in the fragment buffer (col. 4, lines 18-30 and col. 5, lines 45-47); returning fragments not corresponding the predetermined one into fragment buffer for later-consideration as a predetermined one (Fig. 3, step 324); and performing the repeating until no fragments are left in the fragment buffer (Fig. 3, step 328).

With regard to claim 21, Morein describes compositing fragments for overlapping visible data in back-to-front manner, by first, polling the fragment buffer to identify any fragment representing closest opaque data for the particular pixel location and moving such fragment to a frame buffer (col. 5, lines 30-45), second, culling fragments obscured by the closest opaque data (Fig. 3, step 308), and third, identifying and compositing with contents of the frame buffer each fragment remaining the fragment buffer representing furthest data for the particular pixel location (Fig. 3, step 322).

With regard to claim 22, Morein describes means for identifying and storing any fragment representing closest opaque data (Fig. 3, step 302) or furthest transparent fragment if there is no closest opaque data (Fig. 3, step 316); and means for successively detecting and blending with the stored fragment in order of greatest depth each remaining fragment representing furthest unprocessed unobscured visible data (Fig. 3, step 322).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morein, U.S. Patent No. 6,670,055, in view of Schilling, "A New Simple and Efficient Antialiasing with Subpixel Masks".

With regard to claim 3, Morein is relied upon for describing each fragment for the pixel location, as discussed in the 102 rejection above. Morein fails to explicitly describe a sub-pixel mask and wherein said device further comprises one of instructions stored and hardware associated with the device that implements antialiasing using the sub-pixel mask to blend visual contributions by each fragment representing visible data in dependence upon the associated mask, as further recited in claim 3. However,

Schilling teaches the further recited limitations of claim 3 (see Schilling, page 1, Abstract and Introduction).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify Morein to incorporate the antialiasing with subpixel mask algorithm of Schilling because the use of a subpixel mask for antialiasing purposes is very common and well known, and has several advantages compared with other antialiasing techniques, including easy computation and preservation of spatial information. Motoivation for such a combination may be found, for example, in Schilling, page 1, the Introduction section).

With regard to claim 13, Morein is relied upon for describing each fragment for the pixel location, as discussed in the 102 rejection above. Morein fails to explicitly describe a sub-pixel mask and wherein said method further comprises performing antialiasing using the sub-pixel mask to blend visual contributions by each fragment for the pixel location in a manner responsive to values of each mask, as further recited in claim 13. However, Schilling teaches the further recited limitations of claim 13 (see Schilling, page 1, Abstract and Introduction).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify Morein to incorporate the antialiasing with subpixel mask algorithm of Schilling because the use of a subpixel mask for antialiasing purposes is very common and well known, and has several advantages compared with other antialiasing techniques, including easy computation and preservation of spatial

information. Motoivation for such a combination may be found, for example, in Schilling, page 1, the Introduction section).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon Hadidi whose telephone number is 703-605-1187. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 703-305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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